

The avifauna of a semideciduous seasonal forest fragment in the countryside of Barra Mansa, Rio de Janeiro, Brazil

A avifauna de um fragmento de floresta estacional semidecídua na zona rural de Barra Mansa, Rio de Janeiro, Brasil

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ABSTRACT

The Atlantic Forest is one of the richest and most threatened biomes in the world, a fact that configures it as a global *hotspot*. We provide here a list of bird species recorded in the municipality of Barra Mansa (RJ), during ten years of *ad libitum* observations in a fragment of Semideciduous Seasonal Forest, one of the most devastated phytophysionomies of this biome. We recorded 192 species, of which 107 present some degree of forest dependency, 22 that present migratory activity, 24 that are endemic in the biome or in Brazil and 5 that are relevant to conservation as they are almost threatened or vulnerable at some level (global, national or state). Regarding the trophic guild, there was a predominance of insectivorous (n=67) and omnivorous (n=58) species, which denotes some environmental quality, but pressured by an imminent anthropization. Given the obtained results, the importance of the analyzed fragment for the maintenance of the local biodiversity becomes evident.

Keywords: Atlantic Forest; biodiversity; birds; forest fragmentation; Middle Paraiba region.

RESUMO

A mata atlântica é um dos biomas mais ricos e ameaçados do mundo, fato que a configura como um *hotspot* global. É fornecida aqui uma lista de espécies de aves registradas no município de Barra Mansa (RJ), durante dez anos de observações *ad libitum* em um fragmento de floresta estacional semidecidual, uma das fitofisionomias mais devastadas desse bioma. Foram registradas 192 espécies, das quais 107 possuem algum grau de dependência florestal, 22 apresentam atividade migratória, 24 são endêmicas para o bioma ou Brasil e cinco são consideradas com relevância para a conservação por estarem quase ameaçadas ou vulneráveis em algum nível (global, nacional ou estadual). Com relação à guilda trófica, houve uma predominância de espécies insetívoras (n=67) e onívoras (n=58), o que denota uma qualidade ambiental, porém pressionada por uma antropização iminente. Diante dos resultados obtidos, torna-se evidente a importância do fragmento analisado para a manutenção da biodiversidade local encontrada.

Palavras-chave: aves; biodiversidade; fragmentação florestal; mata atlântica; região do Médio Paraíba.

Recebido em: 28 out. 2021
Aceito em: 10 mar. 2022

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INTRODUCTION

The Atlantic Forest is recognized as one of the biggest *hotspots* in the world, as it harbors a high biodiversity combined with high rates of endemism, and also for its history of constant threats suffered over centuries (TABARELLI *et al.*, 2005; PINTO *et al.*, 2006). Currently, this biome is reduced to only 12.5% of its original distribution, where it is estimated that there are about 891 wild bird species, of which 223 are endemic (MOREIRA-LIMA, 2013; SILVA *et al.*, 2016; VALE *et al.*, 2018).

Among the priority areas for the conservation of the Atlantic Forest, the middle Paraíba river region of the state of Rio de Janeiro (RJ), stands out for presenting one of the most devastated phytophysiognomies of this biome: the Submontane Semideciduous Seasonal Forest (POUGY *et al.*, 2018). This entire area was heavily modified and anthropized, being one of the most deforested during the coffee period in Brazil (DEVIDE, 2013).

Because birds present varying degrees of ecological demand and respond in different ways to environmental disturbances, these animals are considered excellent bioindicators to attest to the environmental quality of a given location (PIRATELLI *et al.*, 2008). However, knowledge about the bird community that manages to maintain populations in these remaining fragments is still incipient (RIBON *et al.*, 2003). Surveying the extant species is the first step to better understand the processes of extinction and colonization (FARIA *et al.*, 2006).

This work aims to evaluate the richness and composition of bird species found in a fragment of Submontane Semideciduous Seasonal Forest located within some rural properties in the locality of Santa Rita de Cassia, district of Barra Mansa, in the valley of the Paraíba river, in the state of RJ.

MATERIAL AND METHODS

This work was carried out in an Atlantic Forest forest remnant of the Submontane Semideciduous Seasonal Forest type (VELOSO *et al.*, 1991), located within the limits of seven private countryside properties (farms and country houses), in the locality of Santa Rita de Cassia, district of the municipality of Barra Mansa, state of RJ (figure 1).

The evaluated forest fragment is a secondary formation, in an advanced stage of regeneration (CONAMA, 1993) and it has a total area of 19.8 hectares. Located at the geographic coordinate 22°29'45.40" S 44°09'48.33" W, its terrain has altitudes ranging from 479 to 576 meters high. In addition to the forest fragment studied, the surroundings were also analyzed, that present a predominant matrix of pastures and shrubby scrub, and represent 62.2 % of the total area assessed (51.1 hectares) (figure 2). It is also worth mentioning that the study fragment is located at a distance of approximately 4.5 km (in a straight line) from the ArcelorMittal plant of the municipality of Barra Mansa, a steel industry; and approximately 5 km away (in a straight line) from the Companhia Siderúrgica Nacional (CSN) in the municipality of Volta Redonda, the largest steel industry in Latin America.

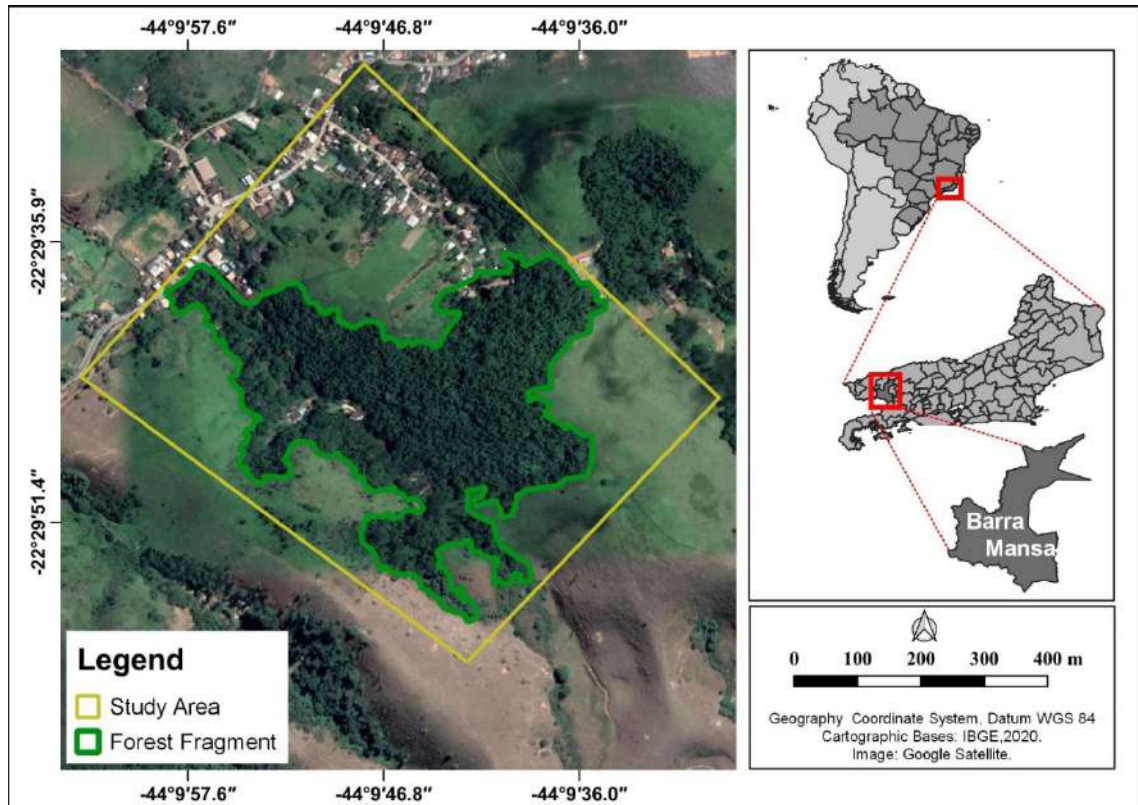


Figure 1 – Evaluated forest fragment and surrounding area. Source: primary.

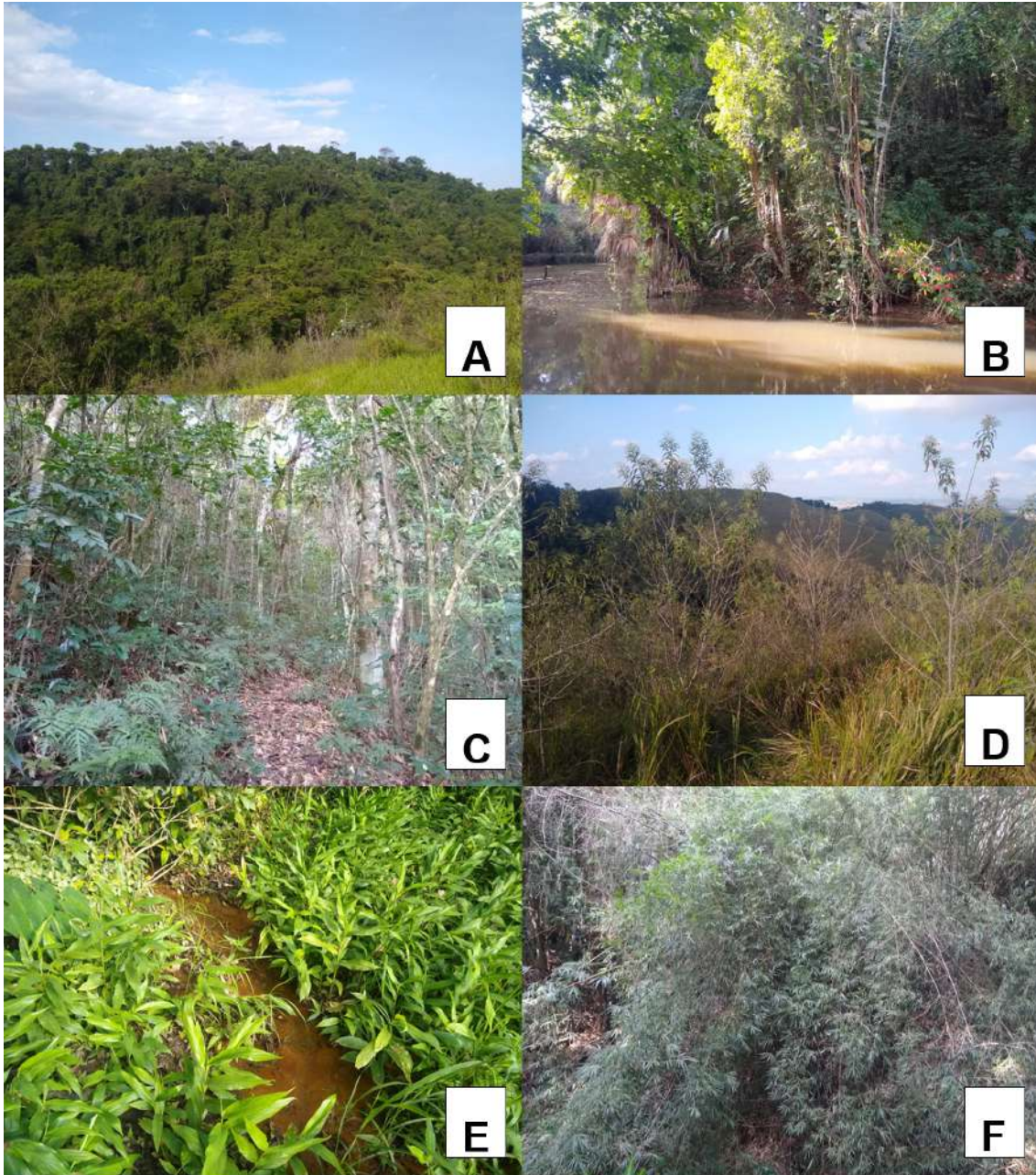


Figure 2 – Some of the different types of environments found in the study area: (A) panoramic view of the Submontane Semideciduous Seasonal Forest fragment; (B) lake; (C) internal view of the forest; (D) formation of shrubby scrub; (E) marsh; (F) bamboo groves. Source: photos by Carlos Nei Ortúzar Ferreira.

Located in the rural area of Barra Mansa city, the village of Santa Rita de Cassia has a strong aptitude for the production of vegetables, in addition to housing many farms that are intended for livestock production (IBGE, 2021) (figure 3).



Figure 3 – (A) Partial view of Santa Rita de Cassia village; (B) Adjacent lands to the forest fragment with vegetables production and farms. Source: photos by Carlos Nei Ortúzar Ferreira.

Ad libitum observations were made over ten years (2011-2021), in the different environments found in the fragment and surroundings. To assist the observations, Bushnell H2O Waterproof 12 x 25 mm 132105C binoculars were used, as well as the *playback* technique that consists of reproducing the song or call of a certain species in order to instigate its response and approximation (VIELLIARD & SILVA, 2010). For the purpose of documenting some records, photos were taken using a Kodak Easyshare max z990 camera model, 30Xis wide angle lens, 12 megapixels, a full hd 1080 recorder; as well as songs sound recordings by using a Motorola Moto G6 XT1925 Smartphone model. All of these documented records were deposited in the database of the digital citizen science platform “Wiki Aves – The Encyclopedia of Birds”.

The conservation statuses of the observed species were categorized into three levels of analytical standardization: at a global level according to the International Union for Conservation of Nature (IUCN, 2021); at a national level according to the Ministry of Environment (ICMBio; MMA, 2018); and at a state level (Rio de Janeiro) following Bergallo *et al.* (2000). The criteria used to assess the categorization of endemism and migratory habits followed the most recent information contained in the scientific literature, with endemism following Moreira-Lima (2013) and Vale *et al.* (2018) and with the migration issue based on Somenzari *et al.* (2018). Criteria such as eating habits and forest dependence were also categorized by using specialized literature (WILLIS, 1979; MOTTA-JÚNIOR, 1990; STOTZ *et al.*, 1996; SICK, 1997; WILMAN *et al.*, 2014). The taxonomic classification follows the Brazilian Committee of Ornithological Records (PACHECO *et al.*, 2021).

RESULTS AND DISCUSSION

In total, 192 species were registered, distributed in 51 families of 21 different orders. The order Passeriformes presented the greatest diversity of taxa, representing about 58.3 % of the observed species (n=112). The most representative families were Tyrannidae (n=26 species) and Thraupidae (n=25), respectively. Of the total species, 107 have some degree of forest dependence (55 dependent, 52 semi-dependent), 22 show migratory activity (3 migratory, 19 partially migratory) and 24 are endemic to the Atlantic Forest biome or to Brazil. Five species are considered relevant for conservation because they are nearly threatened or vulnerable at some level (globally, nationally or stately). Regarding the trophic guild, there was a predominance of insectivorous (n=67) and omnivorous (n=58) species (figures 4-8) (table 1).

Table 1 – List of bird species recorded in Santa Rita de Cassia, Barra Mansa, RJ, Brazil. Legend: Local of Record: OA = Open Areas (pasture); F = Forest Fragments; L = Lakes; FA = Flying over the area; U = Urban Area. Forest dependency: D = Dependent; SD = Semi-dependent; I = Independent. Migratory Status: R = Resident; PM = Partially migratory; MGT = Migratory. Conservation Status: LC = Least Concern; NT = Near Threatened; VU = Vulnerable (GL= Global, NT = National, ST= State). Endemism: AF = Atlantic Forest; BR= Brazil. Trophic guild: CAR = Carnivore; DET = Detritivore; FRU = Frugivore; GRA = Granivore; INS = Insectivorous; NEC = Nectarivorous; ONI = Omnivorous.

Taxa	English name	Local of Record	Forest dependency	Migratory status	Conservation status	Endemism	Trophic guild
TINAMIFORMES							
Tinamidae							
<i>Crypturellus tataupa</i> (Temminck, 1815)	Tataupa Tinamou	F	D	R	LC	–	ONI
GALLIFORMES							
Cracidae							
<i>Penelope obscura</i> (Temminck, 1815)	Dusky-legged Guan	F	D	R	LC	–	FRU
COLUMBIFORMES							
Columbidae							
<i>Columbina talpacoti</i> (Temminck, 1810)	Ruddy Ground-Dove	OA, F, U	I	R	LC	–	GRA
<i>Columba livia</i> (Gmelin, 1789)	Rock Pigeon	U	I	R	LC	–	GRA/ FRU
<i>Patagioenas picazuro</i> (Temminck, 1813)	Picazuro Pigeon	OA, F, U	SD	R	LC	–	FRU
<i>Leptotila verreauxi</i> (Bonaparte, 1855)	White-tipped Dove	F	SD	R	LC	–	FRU
<i>Leptotila rufaxilla</i> (Richard & Bernard, 1792)	Gray-fronted Dove	F	D	R	LC	–	FRU
CUCULIFORMES							
Cuculidae							
<i>Piaya cayana</i> (Linnaeus, 1766)	Squirrel Cuckoo	OA, F	SD	R	LC	–	CAR
<i>Crotophaga ani</i> (Linnaeus, 1758)	Smooth-billed Ani	OA, U	I	R	LC	–	CAR
<i>Guira guira</i> (Gmelin, 1788)	Guira Cuckoo	OA, U	I	R	LC	–	CAR
<i>Tapera naevia</i> (Linnaeus, 1766)	Striped Cuckoo	OA, F	I	R	LC	–	CAR
NYCTIBIIFORMES							
Nyctibiidae							
<i>Nyctibius griseus</i> (Gmelin, 1789)	Common Potoo	OA	SD	MGT	LC	–	INS
CAPRIMULGIFORMES							
Caprimulgidae							
<i>Nyctidromus albicollis</i> (Gmelin, 1789)	Common Pauraque	OA	SD	R	LC	–	INS
<i>Hydropsalis torquata</i> (Gmelin, 1789)	Scissor-tailed Nightjar	OA	SD	R	LC	–	INS
APODIFORMES							
Apodidae							
<i>Streptoprocne zonaris</i> (Shaw, 1796)	White-collared Swift	FA	I	R	LC	–	INS
<i>Chaetura meridionalis</i> (Hellmayr, 1907)	Sick's Swift	FA	SD	R	LC	–	INS
Trochilidae							
<i>Phaethornis pretrei</i> (Lesson & Delattre, 1839)	Planalto Hermit Swallow-tailed	OA, F	SD	R	LC	–	NEC
<i>Eupetomena macroura</i> (Gmelin, 1788)	Hummingbird	OA, U	I	R	LC	–	NEC
<i>Florisuga fusca</i> (Vieillot, 1817)	Black Jacobin	F	D	PM	LC	–	NEC
<i>Anthracothorax nigricollis</i> (Vieillot, 1817)	Black-throated Mango	OA	SD	PM	LC	–	NEC
<i>Chlorostilbon lucidus</i> (Shaw, 1812)	Glittering-bellied Emerald	OA, U	I	R	LC	–	NEC
<i>Thalurania glaucopis</i> (Gmelin, 1788)	Violet-capped Woodnymph	F	D	R	LC	AF	NEC
<i>Chionomesa lactea</i> (Lesson, 1832)	Sapphire-spangled Emerald	OA, U	SD	R	LC	–	NEC
<i>Calliphlox amethystina</i> (Boddaert, 1783)	Amethyst Woodstar	OA	SD	R	LC	–	NEC

To be continued...

Continuation of table 1

Taxa	English name	Local of Record	Forest dependency	Migratory status	Conservation status	Endemism	Trophic guild
GRUIFORMES							
Aramidae							
<i>Aramus guarauna</i> (Linnaeus, 1766)	Limpkin	OA, L	I	R	LC	–	ONI
Rallidae							
<i>Aramides saracura</i> (Spix, 1825)	Slaty-breasted Wood-Rail	F, L	D	R	LC	AF	ONI
<i>Laterallus melanophaius</i> (Vieillot, 1819)	Rufous-side Crake	OA	SD	R	LC	–	ONI
<i>Pardirallus nigricans</i> (Vieillot, 1819)	Blackish Rail	OA	SD	R	LC	–	ONI
CHARADRIIFORMES							
Charadriidae							
<i>Vanellus chilensis</i> (Molina, 1782)	Southern Lapwing	OA	I	R	LC	–	ONI
SULIFORMES							
Anhingidae							
<i>Anhinga anhinga</i> (Linnaeus, 1766)	Anhinga	L	I	R	VU (ST)	–	CAR
Phalacrocoracidae							
<i>Nannopterum brasilianum</i> (Gmelin, 1789)	Neotropic Cormorant	L	I	R	LC	–	CAR
PELECANIFORMES							
Ardeidae							
<i>Tigrisoma lineatum</i> (Boddaert, 1783)	Rufescent Tiger-Heron	F, L	I	R	LC	–	ONI
<i>Nycticorax nycticorax</i> (Linnaeus, 1758)	Black-crowned Night-Heron	OA, L	I	R	LC	–	ONI
<i>Butorides striata</i> (Linnaeus, 1758)	Striated Heron	OA, L	I	R	LC	–	ONI
<i>Bubulcus ibis</i> (Linnaeus, 1758)	Cattle Egret	OA	I	R	LC	–	ONI
<i>Ardea alba</i> (Linnaeus, 1758)	Great Egret	OA, L	I	R	LC	–	ONI
<i>Syrigma sibilatrix</i> (Temminck, 1824)	Whistling Heron	OA, L	I	R	LC	–	ONI
<i>Pilherodius pileatus</i> (Boddaert, 1783)	Capped Heron	F, L	I	R	NT (ST)	–	ONI
<i>Egretta thula</i> (Molina, 1782)	Snowy Egret	L	I	R	LC	–	ONI
Threskiornithidae							
<i>Mesembrinibis cayennensis</i> (Gmelin, 1789)	Green Ibis	L	I	R	LC	–	ONI
<i>Theristicus caudatus</i> (Boddaert, 1783)	Buff-necked Ibis	OA	I	R	LC	–	ONI
CATHARTIFORMES							
Cathartidae							
<i>Cathartes aura</i> (Linnaeus, 1758)	Turkey Vulture	OA, FA	I	R	LC	–	DET
<i>Cathartes burrovianus</i> (Cassin, 1845)	Lesser Yellow-headed Vulture	FA	I	R	LC	–	DET
<i>Coragyps atratus</i> (Bechstein, 1793)	Black Vulture	OA, F, FA, U	I	R	LC	–	DET
ACCIPITRIFORMES							
Accipitridae							
<i>Leptodon cayanensis</i> (Latham, 1790)	Gray-headed Kite	F	D	R	LC	–	CAR
<i>Elanoides forficatus</i> (Linnaeus, 1758)	Swallow-tailed Kite	FA	I	PM	LC	–	CAR
<i>Harpagus diodon</i> (Temminck, 1823)	Rufous-thighed Kite	F	D	MGT	LC	–	CAR
<i>Heterospizias meridionalis</i> (Latham, 1790)	Savanna Hawk	OA	I	R	LC	–	CAR
<i>Rupornis magnirostris</i> (Gmelin, 1788)	Roadside Hawk	OA, F	I	R	LC	–	CAR
<i>Geranoaetus albicaudatus</i> (Vieillot, 1816)	White-tailed Hawk	OA, F	I	R	LC	–	CAR
<i>Buteo brachyurus</i> (Vieillot, 1816)	Short-tailed Hawk	F	SD	R	LC	–	CAR
STRIGIFORMES							
Tytonidae							
<i>Tyto furcata</i> (Temminck, 1827)	American Barn Owl	OA	I	R	LC	–	CAR

To be continued...

Continuation of table 1

Taxa	English name	Local of Record	Forest dependency	Migratory status	Conservation status	Endemism	Trophic guild
Strigidae							
<i>Megascops choliba</i> (Vieillot, 1817)	Tropical Screech-Owl	OA, F, U	SD	R	LC	–	CAR
<i>Pulsatrix koenigswaldiana</i> (Bertoni & Bertoni, 1901)	Tawny-browed Owl	F	D	R	LC	AF	CAR
<i>Strix virgata</i> (Cassin, 1849)	Mottled Owl	F	D	R	LC	–	CAR
<i>Glaucidium brasilianum</i> (Gmelin, 1788)	Ferruginous Pygmy-Owl	F	SD	R	LC	–	CAR
<i>Athene cunicularia</i> (Molina, 1782)	Burrowing Owl	OA	I	R	LC	–	INS
<i>Asio clamator</i> (Vieillot, 1808)	Striped Owl	OA	SD	R	LC	–	CAR
CORACIIFORMES							
Alcedinidae							
<i>Megaceryle torquata</i> (Linnaeus, 1766)	Ringed Kingfisher	L	I	R	LC	–	CAR
<i>Chloroceryle amazona</i> (Latham, 1790)	Amazon Kingfisher	L	SD	R	LC	–	CAR
<i>Chloroceryle americana</i> (Gmelin, 1788)	Green Kingfisher	L	SD	R	LC	–	CAR
GALBULIFORMES							
Bucconidae							
<i>Nystalus chacuru</i> (Vieillot, 1816)	White-eared Puffbird	OA	I	R	LC	–	INS
PICIFORMES							
Ramphastidae							
<i>Ramphastos toco</i> (Statius Muller, 1776)	Toco Toucan	OA, U	I	R	LC	–	ONI
Picidae							
<i>Picumnus cirratus</i> (Temminck, 1825)	White-barred Piculet	OA, F	SD	R	LC	–	INS
<i>Melanerpes candidus</i> (Otto, 1796)	White Woodpecker	OA	SD	R	LC	–	INS
<i>Veniliornis maculifrons</i> (Spix, 1824)	Yellow-eared Woodpecker	F	D	R	LC	AF/ BR	INS
<i>Colaptes melanochloros</i> (Gmelin, 1788)	Green-barred Woodpecker	F	SD	R	LC	–	INS
<i>Colaptes campestris</i> (Vieillot, 1818)	Campo Flicker	OA	I	R	LC	–	INS
<i>Dryocopus lineatus</i> (Linnaeus, 1766)	Lineated Woodpecker	F	SD	R	LC	–	INS
<i>Campephilus robustus</i> (Lichtenstein, 1818)	Robust Woodpecker	F	D	R	NT (ST)	AF	INS
CARIAMIFORMES							
Cariamidae							
<i>Cariama cristata</i> (Linnaeus, 1766)	Red-legged Seriema	OA	I	R	LC	–	ONI
FALCONIFORMES							
Falconidae							
<i>Caracara plancus</i> (Miller, 1777)	Southern Caracara	OA, U	I	R	LC	–	CAR
<i>Milvago chimachima</i> (Vieillot, 1816)	Yellow-headed Caracara	OA, U	I	R	LC	–	CAR
<i>Herpethotes cachinnans</i> (Linnaeus, 1758)	Laughing Falcon	F	SD	R	LC	–	CAR
<i>Falco sparverius</i> (Linnaeus, 1758)	American Kestrel	OA	I	R	LC	–	CAR
<i>Falco femoralis</i> (Temminck, 1822)	Aplomado Falcon	OA	I	R	LC	–	CAR
PSITTACIFORMES							
Psittacidae							
<i>Primolius maracana</i> (Vieillot, 1816)	Blue-winged Macaw	OA, F	SD	R	NT (GL)	–	FRU
<i>Psittacara leucophthalmus</i> (Statius Muller, 1776)	White-eyed Parakeet	OA, F, U	SD	R	LC	–	FRU
<i>Forpus xanthopterygius</i> (Spix, 1824)	Blue-winged Parrotlet	OA, F	SD	R	LC	–	FRU
<i>Pionus maximiliani</i> (Kuhl, 1820)	Scaly-headed Parrot	OA, F	D	R	LC	–	FRU

To be continued...

Continuation of table 1

Taxa	English name	Local of Record	Forest dependency	Migratory status	Conservation status	Endemism	Trophic guild
PASSERIFORMES							
Thamnophilidae							
<i>Dysithamnus mentalis</i> (Temminck, 1823)	Plain Antwreio	F	D	R	LC	–	INS
<i>Thamnophilus ruficapillus</i> (Vieillot, 1816)	Rufous-capped Antshrike	OA	I	R	LC	–	INS
<i>Thamnophilus caeruleus</i> (Vieillot, 1816)	Variable Antshrike	F	D	R	LC	–	INS
<i>Hypoedaleus guttatus</i> (Vieillot, 1816)	Spot-backed Antshrike	F	D	R	LC	AF	INS
Conopophagidae							
<i>Conopophaga lineata</i> (Wied, 1831)	Rufous Gnatcatcher	F	D	R	LC	–	INS
Dendrocolaptidae							
<i>Campylorhamphus falcularius</i> (Vieillot, 1822)	Black-billed Scythebill	F	D	R	LC	AF	INS
<i>Lepidocolaptes angustirostris</i> (Vieillot, 1818)	Narrow-billed Woodcreeper	OA	I	R	LC	–	INS
Xenopidae							
<i>Xenops rutilans</i> (Temminck, 1821)	Streaked Xenops	F	D	R	LC	–	INS
Furnariidae							
<i>Furnarius figulus</i> (Lichtenstein, 1823)	Wing-banded Hornero	OA	I	R	LC	BR	INS
<i>Furnarius rufus</i> (Gmelin, 1788)	Rufous Hornero	OA, U	I	R	LC	–	INS
<i>Phacellodomus rufifrons</i> (Wied, 1821)	Rufous-fronted Thornbird	OA	SD	R	LC	–	INS
<i>Phacellodomus erythrophthalmus</i> (Wied, 1821)	Orange-eyed Thornbird	F	D	R	LC	AF/ BR	INS
<i>Certhiaxis cinnamomeus</i> (Gmelin, 1788)	Yellow-chinned Spinetail	OA, L	I	R	LC	–	INS
<i>Synallaxis ruficapilla</i> (Vieillot, 1819)	Rufous-capped Spinetail	F	D	R	LC	AF	INS
<i>Synallaxis albescens</i> (Temminck, 1823)	Pale-breasted Spinetail	OA	I	R	LC	–	INS
<i>Synallaxis spixi</i> (Sclater, 1856)	Spix's Spinetail	OA	D	R	LC	–	INS
<i>Cranioleuca pallida</i> (Wied, 1831)	Pallid Spinetail	F	D	R	LC	AF/ BR	INS
Pipridae							
<i>Manacus manacus</i> (Linnaeus, 1766)	White-bearded Manakin	F	D	R	LC	–	FRU
<i>Chiroxiphia caudata</i> (Shaw & Nodder, 1793)	Swallow-tailed Manakin	F	D	R	LC	AF	FRU
Tityridae							
<i>Schiffornis virescens</i> (Lafresnaye, 1838)	Greenish Schiffornis	F	D	R	LC	AF	FRU
<i>Pachyramphus polychopterus</i> (Vieillot, 1818)	White-winged Becard	F	SD	PM	LC	–	ONI
<i>Pachyramphus validus</i> (Lichtenstein, 1823)	Crested Becard	F	D	PM	LC	–	ONI
Rhynchocyclidae							
<i>Mionectes rufiventris</i> (Cabanis, 1846)	Gray-hooded Flycatcher	F	D	R	LC	AF	FRU
<i>Leptopogon amaurocephalus</i> (Tschudi, 1846)	Sepia-capped Flycatcher	F	D	R	LC	–	INS
<i>Corythopis delalandi</i> (Lesson, 1830)	Southern Antpipit	F	D	R	LC	–	INS
<i>Tolmomyias sulphurescens</i> (Spix, 1825)	Yellow-olive Flycatcher	F	D	R	LC	–	INS
<i>Todirostrum poliocephalum</i> (Wied, 1831)	Gray-headed Tody-Flycatcher	OA, F	D	R	LC	AF/ BR	INS
<i>Todirostrum cinereum</i> (Linnaeus, 1766)	Common Tody-Flycatcher	OA, U	SD	R	LC	–	INS
<i>Myiornis auricularius</i> (Vieillot, 1818)	Eared Pygmy-Tyrant	F	D	R	LC	AF	INS
Tyrannidae							
<i>Hirundinea ferruginea</i> (Gmelin, 1788)	Cliff Flycatcher	OA, U	SD	R	LC	–	INS
<i>Camptostoma obsoletum</i> (Temminck, 1824)	Southern Beardless-Tyrannulet	OA, U	I	R	LC	–	INS
<i>Elaenia flavogaster</i> (Thunberg, 1822)	Yellow-bellied Elaenia	OA	SD	R	LC	–	ONI
<i>Capsiempis flaveola</i> (Lichtenstein, 1823)	Yellow Tyrannulet	OA	SD	R	LC	–	INS

To be continued...

Continuation of table 1

Taxa	English name	Local of Record	Forest dependency	Migratory status	Conservation status	Endemism	Trophic guild
<i>Phyllomyias fasciatus</i> (Thunberg, 1822)	Planalto Tyrannulet	F	SD	R	LC	–	INS
<i>Attila rufus</i> (Vieillot, 1819)	Gray-hooded Attila	F	D	R	LC	AF	ONI
<i>Myiarchus swainsoni</i> (Cabanis & Heine, 1859)	Swainson's Flycatcher	OA, F	I	PM	LC	–	ONI
<i>Myiarchus ferox</i> (Gmelin, 1789)	Short-crested Flycatcher	OA, F	SD	R	LC	–	ONI
<i>Myiarchus tyrannulus</i> (Statius Muller, 1776)	Brown-crested Flycatcher	OA, F	SD	R	LC	–	ONI
<i>Pitangus sulphuratus</i> (Linnaeus, 1766)	Great Kiskadee	OA, F, U	I	PM	LC	–	ONI
<i>Machetornis rixosa</i> (Vieillot, 1819)	Cattle Tyrant	OA, U	I	R	LC	–	INS
<i>Myiodynastes maculatus</i> (Statius Muller, 1776)	Streaked Flycatcher	OA, U	SD	PM	LC	–	ONI
<i>Megarynchus pitangua</i> (Linnaeus, 1766)	Boat-billed Flycatcher	OA, U	SD	R	LC	–	ONI
<i>Myiozetetes similis</i> (Spix, 1825)	Social Flycatcher	OA, L, U	SD	R	LC	–	ONI
<i>Tyrannus melancholicus</i> (Vieillot, 1819)	Tropical Kingbird	OA, U	I	PM	LC	–	ONI
<i>Tyrannus savana</i> (Daudin, 1802)	Fork-tailed Flycatcher	OA	I	PM	LC	–	ONI
<i>Empidonomus varius</i> (Vieillot, 1818)	Variegated Flycatcher	OA, U	SD	PM	LC	–	INS
<i>Colonia colonus</i> (Vieillot, 1818)	Long-tailed Tyrant	F	D	R	LC	–	INS
<i>Myiophobus fasciatus</i> (Statius Muller, 1776)	Bran-colored Flycatcher	OA	I	R	LC	–	INS
<i>Fluvicola nengeta</i> (Linnaeus, 1766)	Masked Water-Tyrant	OA, L	I	R	LC	–	INS
<i>Lathrotriccus euleri</i> (Cabanis, 1868)	Euler's Flycatcher	F	D	PM	LC	–	INS
<i>Contopus cinereus</i> (Spix, 1825)	Tropical Pewee	F	SD	R	LC	–	INS
<i>Knipolegus lophotes</i> (Boie, 1828)	Crested Black-Tyrant	OA	I	R	LC	–	INS
<i>Satrapa icterophrys</i> (Vieillot, 1818)	Yellow-browed Tyrant	OA	I	R	LC	–	INS
<i>Xolmis cinereus</i> (Vieillot, 1816)	Gray Monjita	OA	I	R	LC	–	INS
<i>Xolmis velatus</i> (Lichtenstein, 1823)	White-rumped Monjita	OA	I	R	LC	–	INS
Vireonidae							
<i>Cyclarhis gujanensis</i> (Gmelin, 1789)	Rufous-browed Peppershrike	OA, F	SD	R	LC	–	ONI
<i>Vireo chivi</i> (Vieillot, 1817)	Chivi Vireo	F	D	PM	LC	–	ONI
Corvidae							
<i>Cyanocorax cristatellus</i> (Temminck, 1823)	Curl-crested Jay	OA	I	R	LC	–	ONI
Hirundinidae							
<i>Pygochelidon cyanoleuca</i> (Vieillot, 1817)	Blue-and-white Swallow	OA, U	I	R	LC	–	INS
<i>Stelgidopteryx ruficollis</i> (Vieillot, 1817)	Southern Rough-winged Swallow	OA	I	PM	LC	–	INS
<i>Progne tapera</i> (Vieillot, 1817)	Brown-chested Martin	OA	I	PM	LC	–	INS
<i>Progne chalybea</i> (Gmelin, 1789)	Gray-breasted Martin	OA, U	I	PM	LC	–	INS
Troglodytidae							
<i>Troglodytes musculus</i> (Naumann, 1823)	Southern House Wren	OA, U	I	R	LC	–	INS
<i>Cantorchilus longirostris</i> (Vieillot, 1819)	Long-billed Wren	F	D	R	LC	AF/ BR	INS
Donacobiidae							
<i>Donacobius atricapilla</i> (Linnaeus, 1766)	Black-capped Donacobius	OA	I	R	LC	–	INS
Turdidae							
<i>Turdus flavipes</i> (Vieillot, 1818)	Yellow-legged Thrush	F	D	MGT	LC	–	ONI
<i>Turdus leucomelas</i> (Vieillot, 1818)	Pale-breasted Thrush	OA, F, U	SD	R	LC	–	ONI
<i>Turdus rufiventris</i> (Vieillot, 1818)	Rufous-bellied Thrush	F, U	I	R	LC	–	ONI
<i>Turdus albicollis</i> (Vieillot, 1818)	White-necked Thrush	F	D	R	LC	–	ONI
Mimidae							
<i>Mimus saturninus</i> (Lichtenstein, 1823)	Chalk-browed Mockingbird	OA	I	R	LC	–	ONI

To be continued...

Continuation of table 1

Taxa	English name	Local of Record	Forest dependency	Migratory status	Conservation status	Endemism	Trophic guild
Estrildidae							
<i>Estrilda astrild</i> (Linnaeus, 1758)	Common Waxbill	OA, U	I	R	LC	–	GRA
Passeridae							
<i>Passer domesticus</i> (Linnaeus, 1758)	House Sparrow	U	I	R	LC	–	ONI
Motacillidae							
<i>Anthus lutescens</i> (Pucheran, 1855)	Yellowish Pipit	OA	I	R	LC	–	INS
Fringillidae							
<i>Spinus magellanicus</i> (Vieillot, 1805)	Hooded Siskin	OA	I	R	LC	–	GRA
<i>Euphonia chlorotica</i> (Linnaeus, 1766)	Purple-throated Euphonia	OA, F, U	SD	R	LC	–	ONI
Passerellidae							
<i>Zonotrichia capensis</i> (Statius Muller, 1776)	Rufous-collared Sparrow	OA	I	R	LC	–	GRA
<i>Ammodramus humeralis</i> (Bosc, 1792)	Grassland Sparrow	OA	I	R	LC	–	GRA
<i>Arremon semitorquatus</i> (Swainson, 1838)	Half-collared Sparrow	F	D	R	LC	AF/ BR	ONI
Icteridae							
<i>Psarocolius decumanus</i> (Pallas, 1769)	Crested Oropendola	OA, F, U	SD	R	LC	–	ONI
<i>Gnorimopsar chopi</i> (Vieillot, 1819)	Chopi Blackbird	OA	I	R	LC	–	ONI
<i>Molothrus bonariensis</i> (Gmelin, 1789)	Shiny Cowbird	OA	I	R	LC	–	ONI
<i>Leistes superciliaris</i> (Bonaparte, 1850)	White-browed Meadowlark	OA	I	R	LC	–	ONI
Parulidae							
<i>Setophaga pitiayumi</i> (Vieillot, 1817)	Tropical Parula	OA, F, U	D	R	LC	–	INS
<i>Geothlypis aequinoctialis</i> (Gmelin, 1789)	Masked Yellowthroat	OA	I	R	LC	–	INS
<i>Basileuterus culicivorus</i> (Deppe, 1830)	Golden-crowned Warbler	F	D	R	LC	–	INS
Cardinalidae							
<i>Piranga flava</i> (Vieillot, 1822)	Hepatic Tanager	OA	I	R	LC	–	FRU
<i>Cyanoloxia brissonii</i> (Lichtenstein, 1823)	Ultramarine Grosbeak	OA	D	R	VU (ST)	–	ONI
Thraupidae							
<i>Pipraeidea melanonota</i> (Vieillot, 1819)	Fawn-breasted Tanager	F	D	R	LC	–	ONI
<i>Tangara cyanoventris</i> (Vieillot, 1819)	Gilt-edged Tanager	F	D	R	LC	AF/ BR	INS
<i>Thraupis sayaca</i> (Linnaeus, 1766)	Sayaca Tanager	OA, F, U	SD	R	LC	–	ONI
<i>Thraupis palmarum</i> (Wied, 1821)	Palm Tanager	OA, U	SD	R	LC	–	ONI
<i>Stilpnia cayana</i> (Linnaeus, 1766)	Burnished-buff Tanager	OA, F, U	I	R	LC	–	ONI
<i>Nemosia pileata</i> (Boddaert, 1783)	Hooded Tanager	OA, F	D	R	LC	–	ONI
<i>Conirostrum speciosum</i> (Temminck, 1824)	Chestnut-vented Conebill	OA, F	D	R	LC	–	ONI
<i>Sicalis flaveola</i> (Linnaeus, 1766)	Saffron Finch	OA, U	I	R	LC	–	GRA
<i>Haplospiza unicolor</i> (Cabanis, 1851)	Uniform Finch	F	D	R	LC	AF	INS
<i>Hemithraupis ruficapilla</i> (Vieillot, 1818)	Rufous-headed Tanager	F	D	R	LC	AF/ BR	INS
<i>Volatinia jacarina</i> (Linnaeus, 1766)	Blue-black Grassquit	OA, U	I	R	LC	–	GRA
<i>Trichothraupis melanops</i> (Vieillot, 1818)	Black-goggled Tanager	F	D	R	LC	–	FRU
<i>Coryphospingus pileatus</i> (Wied, 1821)	Pileated Finch	OA	SD	R	LC	–	GRA
<i>Tachyphonus coronatus</i> (Vieillot, 1822)	Ruby-crowned Tanager	F	D	R	LC	AF	ONI
<i>Ramphocelus bresilia</i> (Linnaeus, 1766)	Brazilian Tanager	F	D	R	LC	AF/ BR	ONI
<i>Tersina viridis</i> (Illiger, 1811)	Swallow Tanager	OA, F	D	PM	LC	–	ONI

To be continued...

Continuation of table 1

Taxa	English name	Local of Record	Forest dependency	Migratory status	Conservation status	Endemism	Trophic guild
<i>Dacnis cayana</i> (Linnaeus, 1766)	Blue Dacnis	OA, F, U	SD	R	LC	–	ONI
<i>Coereba flaveola</i> (Linnaeus, 1758)	Bananaquit	OA, F, U	SD	R	LC	–	NEC
<i>Asemospiza fuliginosa</i> (Wied, 1830)	Sooty Grassquit	F	D	R	LC	–	GRA
<i>Sporophila lineola</i> (Linnaeus, 1758)	Lined Seed eater	OA	I	PM	LC	–	GRA
<i>Sporophila caerulescens</i> (Vieillot, 1823)	Double-collared Seed eater	OA, U	I	PM	LC	–	GRA
<i>Sporophila leucoptera</i> (Vieillot, 1817)	White-bellied Seed eater	OA	I	R	LC	–	GRA
<i>Emberizoides herbicola</i> (Vieillot, 1817)	Wedge-tailed Grass-Finch	OA	I	R	LC	–	GRA
<i>Saltator similis</i> (d'Orbigny & Lafresnaye, 1837)	Green-winged Saltator	F	SD	R	LC	–	ONI
<i>Thlypopsis sordida</i> (d'Orbigny & Lafresnaye, 1837)	Orange-headed Tanager	OA	SD	R	LC	–	INS



Figure 4 – Bird species found during surveys: (A) *Thamnophilus caerulescens* (male); (B) *Leptopogon amaurocephalus*; (C) *Thamnophilus caerulescens* (female); (D) *Corythopsis delalandi*; (E) *Trichothraupis melanops*; (F) *Phyllomyias fasciatus*; (G) *Todirostrum policephalum*; (H) *Conopophaga lineata*; (I) *Lathrotriccus euleri*. Source: Photos by Carlos Nei Ortúzar Ferreira.

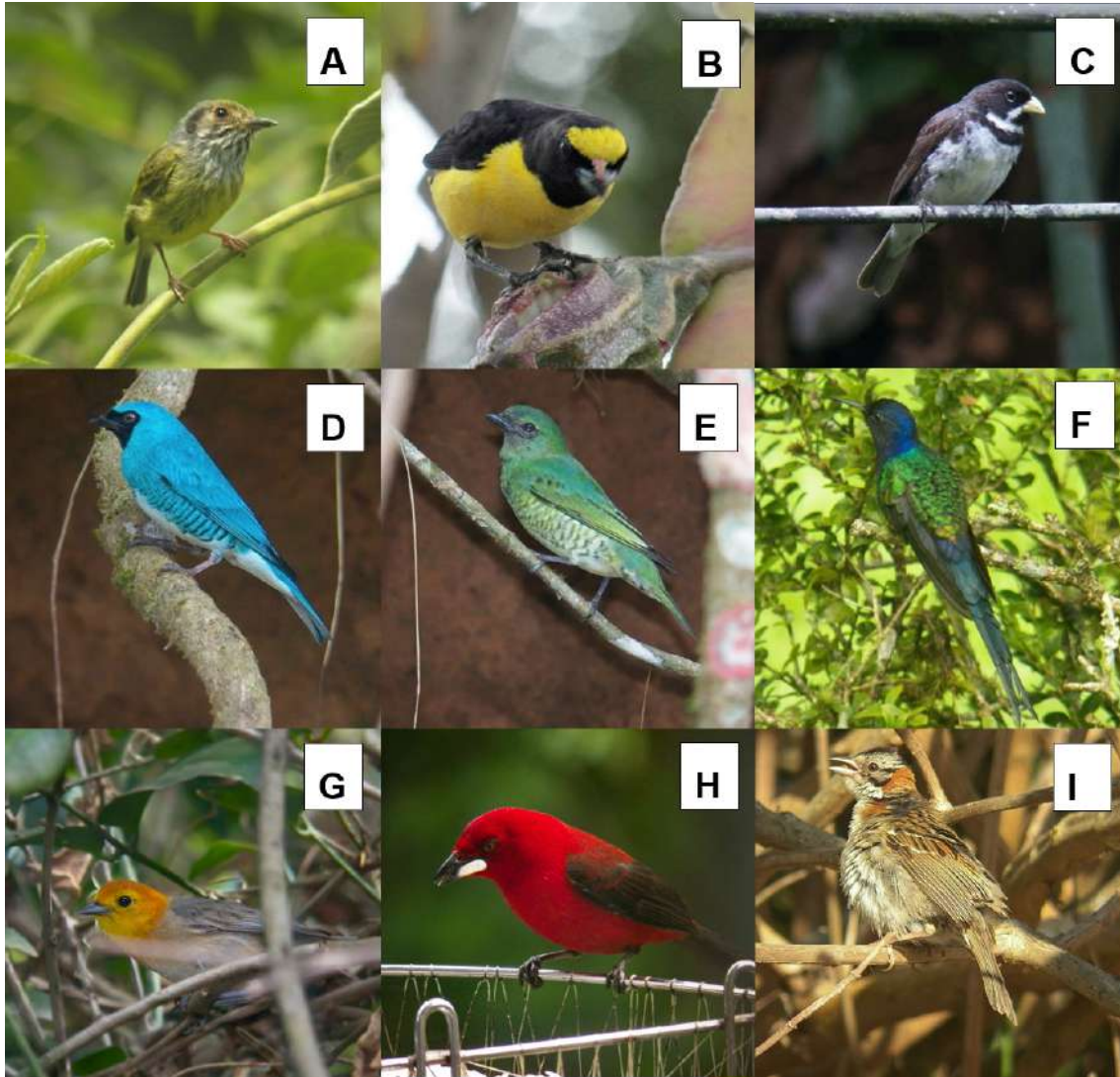


Figure 5 – Bird species found during surveys: (A) *Myiornis auricularius*; (B) *Euphonia chlorotica*; (C) *Sporophila caerulescens*; (D) *Tersina viridis* (male); (E) *Tersina viridis* (female); (F) *Eupetomena macroura*; (G) *Thlypopsis sordida*; (H) *Ramphocelus bresilia*; (I) *Zonotrichia capensis*. Source: Photos by Carlos Nei Ortúzar Ferreira.



Figure 6 – Bird species found during surveys: (A) *Turdus leucomelas*; (B) *Stilpnia cayana* (female); (C) *Stilpnia cayana* (male); (D) *Thalurania glaucopis*; (E) *Turdus rufiventris*; (F) *Phaethornis pretrei*; (G) *Tachyphonus coronatus*; (H) *Thraupis sayaca*; (I) *Thraupis palmarum*. Source: Photos by Carlos Nei Ortúzar Ferreira.



Figure 7 – Bird species found during surveys: (A) *Megascops choliba*; (B) *Megascops choliba*; (C) *Colaptes melanochloros*; (D) *Patagioenas picazuro*; (E) *Aramidés saracura*; (F) *Penelope obscura*; (G) *Nannopterum brasilianum*; (H) *Picumnus cirratus*; (I) *Butorides striata*. Source: Photos by Carlos Nei Ortúzar Ferreira.



Figure 8 – Bird species found during surveys: (A) *Syrygma sibilatrix*; (B) *Ramphastos toco*; (C) *Colonia colonus*; (D) *Caracara plancus*. Source: Photos by Carlos Nei Ortúzar Ferreira.

Comparing this work with other survey data of bird species in the same region and applying a phytophysiognomy analysis (TAVARES, 2019; WIKIAVES, 2021), we can state that the study area presented an expected bird composition, with species that are typical of the Submontane Semideciduous Seasonal Forest. Thus, despite having a small size, being surrounded by pastures and suffering from anthropogenic pressure, the studied forest fragment provides a great ecological service for the maintenance of bird biodiversity in the region.

Wintle *et al.* (2019) found that small forest patches are of paramount importance for the preservation and maintenance of species, especially in the Atlantic Forest, which is mostly reduced to small isolated forest fragments. Therefore, giving up these small fragments would mean giving up a huge biodiversity confined and restricted to these patches of remaining vegetation. Added to this factor, another alarming reality can be seen: the semideciduous seasonal forest phytophysiognomy was one of the most decimated in the entire biome (POUGY *et al.*, 2018). For this reason, the evaluated fragment gains even more importance.

In addition, the obtained results allow us to attest to the existing environmental quality, given the high number of species found with some degree of forest dependence ($n=107$) and of endemic species ($n=24$). Forest dependent species are more demanding in terms of environmental quality and therefore serve as bioindicators (GIMENES & ANJOS, 2003). Endemic species are more affected by habitat fragmentation, because their populations are more restricted and therefore more vulnerable (ALEIXO & VIELLIARD, 1995; ANJOS, 2001; RIBON *et al.*, 2003; SANTOS, 2003).

Regarding the species conservation status, we found three near-threatened and two vulnerable species. *Ptilerodius pileatus* (Boddaert, 1783) and *Campephilus robustus* (Lichtenstein, 1818) are nearly threatened in the state of Rio de Janeiro; *Anhinga anhinga* (Linnaeus, 1766) and *Cyanoloxia brissonii* (Lichtenstein, 1823) are vulnerable, also in the state of Rio (BERGALLO *et al.*, 2000); and *Primolius maracana* (Vieillot, 1816) is almost globally threatened (IUCN, 2021).

Birds with some migratory dynamics represented 11.4% (n=22). Of these, *Harpagus diodon* (Temminck, 1823) and *Turdus flavipes* Vieillot, 1818 are fully migratory species and present forest dependence. Furthermore, *Florisuga fusca* (Vieillot, 1817), *Pachyramphus validus* (Lichtenstein, 1823), *Lathrotriccus euleri* (Cabanis, 1868), *Vireo chivi* (Vieillot, 1817) and *Tersina viridis* (Illiger, 1811) are partially migratory species with forest dependence.

All these listed data further reinforce the importance of the evaluated fragment.

The evaluation of the species trophic guild also proved to be an important environmental indicator. There was a predominance of insectivorous species (n=67) followed by omnivore ones (n=58). The predominance of insectivorous species is an already known pattern for tropical regions, both in more anthropogenic areas and in forest areas (SICK, 1997). However, a high number of omnivorous species has been reported in anthropic regions, as omnivory would have a buffering effect against the variation in the availability of food resources in altered environments (TELINO-JÚNIOR *et al.*, 2005; MORANTE FILHO & SILVEIRA, 2012). Thus, the high representation of omnivorous species demonstrates how the surrounding landscape has been directly influencing the richness and the composition of the fragment's avifauna. Of the listed omnivorous species, 44.8% (n=26) are independent of forest fragments.

Finally, it is important to highlight the risks that housing conglomerates bring to the faunal biodiversity of nearby forests, either by the presence of domestic animals that escape into these fragments, scaring away and sometimes preying on wild animals, or by the practice of hunting, which is still deeply rooted in the minds of some people (BARBOSA *et al.*, 2014; FERNANDES-FERREIRA & ALVES, 2014; BUARQUE *et al.*, 2019). During these ten years of sampling, traces of hunters and some traps left in the fragment were observed, most likely to hunt game animals that inhabit the forest fragment, including some bird species such as *Crypturellus tataupa* (Temminck, 1815) and *Penelope obscura* Temminck, 1815. Added to this, along with the observation of several species typical of open areas around the fragment, the presence of synanthropic species reflects an imminent urbanization that pressures the local biodiversity of the analyzed fragment (WOOD *et al.*, 2014).

ACKNOWLEDGEMENTS

Special thanks to Alda d'Almeida Ferreira, responsible for taking care of the property where part of the analyzed forest fragment is located, and who always made a point of keeping it preserved.

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